

## 13.0 ORTHOPEDICS

In general, any condition which results in surgery will require a package to be submitted with all available documentation (including operative reports) for review of waiver consideration via AERO.

### 13.1 ABNORMAL SPINAL CURVATURE

Last Revised: (GS/FT)  
17 Apr 2014  
Last Reviewed:  
30 May 2014

	Applicant	Class 1			Class 2	Class 3
		SG 1	SG 2	SG 3		
CD	Yes	Yes	Yes	Yes	Yes	Yes
NCD	+/-	+/-	+/-	+/-	+/-	+/-
WR	+/-	+/-	+/-	+/-	+/-	+/-
WNR	+/-	+/-	+/-	+/-	+/-	+/-
LBFS	N/A	No	No	No	No	No
EXCEPTIONS	None					
LIMDU/PEB	If LIMDU/PEB has been held, Grounding PE and AMS should be submitted when board written. Results of this board must be included in waiver package. Member not eligible for waiver until returned to Full Duty by Board.					

Key	
Yes	For: 1) Scoliosis of the thoracic or lumbar spine over 20 degrees; 2) Thoracic kyphosis over 40 degrees; and 3) Lumbar lordosis > 50 degrees for applicants and for designated personnel > 55 degrees (all measured by Cobb angle)
+/-	Depends upon whether listed requirements met, waiver may or may not be recommended ("Case-by-Case" basis)

**AEROMEDICAL CONCERNS:** Excessive kyphosis, scoliosis, lordosis, or combinations of them may subject the intervertebral disks to excessive Gz+ loads during ejection. In a classic review by Griffin, the incidence of spinal fractures during ejection seat operations was found to be associated with the posture adopted at the time of ejection. Spinal fractures were noted to occur more frequently when pilots were in slight flexion to initiate pan handle-activated mechanisms, but less frequently when they used a face-curtain system that permitted an induced extension of the spine [1]. It is therefore reasonable to assume that pre-existing spinal deformities similarly expose the pilot to increased risk. Symptomatic conditions may cause distracting backache during prolonged restriction in a confined cockpit and subjection to vibration or excessive G forces.

Abnormal spinal curvature beyond 30 degrees poses risk for ejection injury. The center of gravity of the upper torso lies in front of the spine. Whenever loads are applied along the spinal axis, as in ejection, a bending movement is produced which increases the likelihood of a compression fracture. While a waiver is possible for designated aircrew, there is little point in considering a waiver for applicants as initial training will involve ejection seat aircraft. The long term outcome in cases of scoliosis up to 30 degrees is very favorable, but above 30 degrees is uncertain. Note that there is a 3-5 degree error in measurements taken by the Cobb method.

**WAIVER:** Scoliosis of the thoracic or lumbar spine over 20 degrees, as measured by the Cobb method, is disqualifying with no waiver for applicants, but can be waived up to 30 degrees on a case-by-case basis in designated personnel. Thoracic kyphosis over 40 degrees is CD, but can be waived up to 45 degrees in designated personnel. Waiver is not normally recommended when there is: 1) recurrent uncontrollable pain; 2) interference with function; 3) a neurologic abnormality; or 4) when the condition is progressive.

Lumbar lordosis greater than 50 degrees is disqualifying with no waiver for applicants, but may be waived up to 55 degrees in designated personnel [2 and 3]. On a case-by-case basis, both applicant and designated ATC personnel and UAV operators may be waived up to 30 degrees of thoracic or lumbar scoliosis, which is the standard for general duty, non-aviation personnel. Initial applicants must meet DoD and Department of the Navy Standards as set forth in references [2] and [3] and conditions that do not meet these requirements are Considered Disqualifying, Waiver Not Recommended (CD, WNR).

**DIAGNOSIS/ICD-9 Codes:**

**737 Abnormal Spinal Curvature**

**737.0 Kyphosis**

**737.2 Lordosis**

**737.3 Kyphoscoliosis**

**737.31 Scoliosis, within standards**

**SERVICE MEMBER MUST HAVE COMPLETED AND/OR PROVIDED PRIOR TO INITIATING WAIVER**

- Released from care of orthopedic surgeon, sports medicine physician, osteopathic physician, chiropractic physician, or pain management specialist care with recommendation(s) for the return to flight status with no restrictions - Must be documented on last clinical note (electronic or paper). Further, this consult must state that the spine is asymptomatic, stable, and requires no surgical or other invasive intervention.
- If any of the above noted specialty providers document physical limitations, a complete picture of the patient's level of physical activity and limitations must be included in the documentation.
- Any surgery/procedure note(s) (electronic or paper) utilized in the treatment of the back pain must be documented.
- Must have completed any course of physical therapy/rehabilitation prescribed by the above noted specialty providers and have received an end of care summary, including any post-care recommendations.
- Copies of prior PEB, FNAEB, or HFB if related to this diagnosis. If placed on LIMDU / PEB or if anticipate grounding for greater than 60 days, present to Flight Surgeon for Grounding Physical.
- Provide administrative information (by electronic or paper form) to include command UIC, command address, personal address, phone number, designator, flight hours (total and last 6 months), primary aircraft flown, and years of service.

**STANDARDS & REQUIREMENTS TO BE MET PRIOR TO SCHEDULING WAIVER EXAM WITH FLIGHT SURGEON**

- **CURRENT PHYSICAL LIMITATIONS:** Curvature of the spine must not interfere with function or wear of the military uniform (i.e. significant shoulder asymmetry) or flight equipment (i.e. gibbus deformity with thoracic kyphosis). In addition, the member must be able to demonstrate the ability to perform all required flight duties without assistance or need for pain medication.
- **TREATMENT:** Scoliosis, if caused by leg length discrepancy, may be improved with a trial of a heel lift on the affected side. Occasional OMT/Manual medicine and/or heel lift therapy when successful is NCD. Surgical treatment is disqualifying. A lower extremity scanogram may disclose the site and extent of a leg length discrepancy.
- **MEDICATIONS:** For designated personnel with abnormal spinal curvature requiring low dose NSAIDs (ibuprofen or naproxen only) or acetaminophen who can maintain close supervision by a Flight Surgeon may be considered for waiver on a case-by-case basis. Any other medication use will require request for waiver. Designated personnel with degenerative disc disease requiring low dose NSAIDs or acetaminophen who can maintain close supervision by a Flight Surgeon may be considered for waiver on a case by case basis. Must not require controlled substances or muscle relaxants to control pain.
- **SPECIAL TEST STANDARDS/FINDINGS/LEVELS:**
  - Documentation of the patient's ability to pass a USN PRT or Marine PFT (as applicable); including a report of the score from each section of the most recent test.
  - Orthopedic consultation with measurement of any scoliosis by the Cobb method. Films should be taken in a standing position, and the measurements made by the radiologist or orthopedist.
  - Subtle EKG abnormalities, RVH, R-axis deviation, RSR' are associated with idiopathic scoliosis. Cardiology consultation may be required if these are noted.

## **AEROMEDICAL SUMMARY REQUIRED DOCUMENTATION BY FLIGHT SURGEON**

How Condition Was Discovered: Mechanism of injury, date of injury, and whether first time or recurrent.

Aviation History: Type of aircraft and type of egress.

Physical Exam: Document any visible asymmetry of the spine; any tenderness on palpation; ability to and degree of flexion/extension, rotate L/R, and side bend L/R; motor, sensory, and reflex findings of related extremities; muscle strength testing of related extremities; results of straight leg test (for lumbar spine).

Studies: Document results of all x-rays, CT scans, and MRI scans obtained in the evaluation of this condition. Report the measurement of the scoliosis by the Cobb method (as noted above). Include EKG results in conjunction with this exam to confirm that the EKG findings discussed above do not exist. Include actual films if measured angle greater than 15 degrees.

Discussion: Brief summary of why this member is WR based on Aeromedical Waiver Guide standards.

Recommendation: NPQ but AA and any caveats for follow on care

Procedure: Upload any operative notes (if applicable).

Medications: Document no longer using any medication for pain. However, for designated personnel with an occasional requirement for continued use of medication for pain, the ONLY acceptable medications for PRN use are acetaminophen, ibuprofen or naproxen.

Consults: Up load final orthopedic, osteopathic, chiropractic, or physical therapy end of care notes (as applicable).

<b>FOLLOW UP REQUIREMENTS</b>	If the service member becomes symptomatic and in accordance with applicable periodic flight physical requirements.
<b>EXAM</b>	Documentation of a serial exam of the spine as described in "Physical Exam" section (above). Note: No serial radiological studies are required for asymptomatic scoliosis, kyphosis, or lordosis.

**APPENDICES:** None

### References:

- [1] Griffin, C. (1975, November). *Proceedings of the Royal Society of Medicine*, 68 (11). London, England.
- [2] Under Secretary of Defense for Personnel and Readiness. (2011, September 13). Section 17 - Spine and Sacroiliac Joints, Enclosure (4), DoD Instruction 6130.03 (Change 1) - *Medical Standards for Appointment, Enlistment, or Induction in the Military Services*, pp 29-30. U.S. Department of Defense. Washington, DC.
- [3] Navy Bureau of Medicine. (2012, May 2). Article 15-48 – Spine and Sacroiliac Joints, Chapter 15 – Physical Examinations and Standards, NAVMED P-117 (Change 140) - *Manual of Medicine*, pp. 15-36 – 15-37. U.S. Department of the Navy. Washington, DC.

## 13.2 ANKYLOSING SPONDYLITIS

**AEROMEDICAL CONCERNS:** Cramped cockpit conditions for prolonged periods may exacerbate the eventual disability. Spinal rigidity in advanced cases is incompatible with ejection, may interfere with emergency ground egress, and can cause restriction in peripheral scan by impairing mobility. Concomitant iritis occurs in between 10 and 25% of cases.

**WAIVER:** An established diagnosis with symptoms is CD. Waiver is possible in early cases with normal mobility and no complications.

### **INFORMATION REQUIRED:**

1. Orthopedic or rheumatology evaluation

**TREATMENT:** The cornerstone of treatment while continuing a flying career is a regular exercise routine which the patient must follow scrupulously. Physical rehabilitation may be necessary following flare-ups. Long term maintenance therapy with non-steroidal anti-inflammatory drugs is usually not considered for waiver.

**DISCUSSION:** Sacroiliitis is often the earliest manifestation of the disease, and can be noted on an AP view of the pelvis. The HLA-B27 gene is present in 90% of Caucasians and 50% of African Americans with ankylosing spondylitis. The ESR and C-reactive protein are usually elevated. Clinical diagnosis should be suspected with a history of chronic back pain, loss of motion of lumbar spine, limited chest expansion, and radiographic evidence of sacroiliitis. Complications include cardiac conduction defects, aortic incompetence, uremia arising from amyloidosis, and chest rigidity giving rise to ventilation/perfusion abnormalities. Spinal cord damage can arise from fractures of the rigid cervical spine, and spontaneous subluxation at the atlantoaxial joint with quadriplegia has been described.

### **ICD-9 CODE:**

**720.0 Ankylosing Spondylitis**

## 13.3 CHRONIC BACKACHE

Last Revised: (GS/FT)  
17 Apr 2014  
Last Reviewed:  
30 May 2014

	Applicant	Class 1			Class 2	Class 3
		SG 1	SG 2	SG 3		
CD	Yes	Yes	Yes	Yes	Yes	Yes
NCD	+/-	+/-	+/-	+/-	+/-	+/-
WR	+/-	+/-	+/-	+/-	+/-	+/-
WNR	+/-	+/-	+/-	+/-	+/-	+/-
LBFS	N/A	No	No	No	No	No
EXCEPTIONS	Somatic dysfunction which is amenable to OMT/Manual medicine, unless persistent, is NCD.					
LIMDU/PEB	If LIMDU/PEB has been held, Grounding PE and AMS should be submitted when board written. Results of this board must be included in waiver package. Member not eligible for waiver until returned to Full Duty by Board.					

Key	
Yes	If chronic and/or recurrent, if exacerbated by flying, if the member has required hospitalization, or if the member requires regular medication for treatment
+/-	Depends upon whether listed requirements met, waiver may or may not be recommended ("Case-by-Case" basis)

**AEROMEDICAL CONCERNS:** Chronic back pain, somatic dysfunction, and/or osteoarthritis of the spine and/or pelvis can make it difficult to remain seated for long periods and can hamper performance. If symptoms are chronic and/or recurrent, exacerbated by flying, if the member has required hospitalization, or if the member requires regular medication beyond occasional Flight Surgeon approved NSAIDs (ibuprofen or naproxen only) or acetaminophen, then the condition is CD.

Most back pain is believed to be caused by biomechanical derangement of the spine and/or sacroiliac joints when harder tissue encroaches on soft nerve tissue causing symptoms of pain, spasms, and numbness. This type of back pain is also known as somatic dysfunction and can sometimes be reduced or alleviated by physicians with training in OMT/Manual medicine. Muscular weakness is not generally found in the diagnosis of somatic dysfunction. "However, more than 85% of patients who present to primary care have low back pain that cannot reliably be attributed to a specific disease or spinal abnormality" [1]. Low back pain has been observed to occur more frequently in helicopter pilots than fixed-wing pilots. A Norwegian Air Force Study reported a 2-year prevalence of low back pain in helicopter pilots that was 32% greater than fixed-wing controls [2]. Further, a 2011 survey of 648 U.S. Navy helicopter pilots from 43 different Navy Helicopter Squadrons found that 71% of participants experienced back pain on at least 50% of their flights and 34% admitted that the pain had affected their situational awareness" [3]. A similar study of British Royal Air Force (RAF) aviators found that 13% of RAF pilots between 20 and 50 experienced low back pain every time that they flew [4 and 5].

**WAIVER:** Waiver may be recommended when the pain is controlled by conservative, non-pharmacologic means, and is not associated with an organic cause. Designated personnel with osteoarthritis requiring low dose NSAIDs who can maintain close supervision by a Flight Surgeon may be considered for waiver on a case by case basis. Somatic dysfunction which is amenable to OMT/Manual medicine, unless persistent, is NCD. Initial applicants must meet DoD and Department of the Navy Standards as set forth in references [6] and [7] and conditions that do not meet these requirements are **Considered Disqualifying, Waiver Not Recommended (CD, WNR)**.

**DIAGNOSIS/ICD-9 Codes:****721.9 Chronic Backache****724.2 Lumbago****724.3 Sciatica****739.1 Somatic Dysfunction, C-spine region****739.2 Somatic Dysfunction, T-spine region****739.3 Somatic Dysfunction, L-spine region****739.4 Somatic Dysfunction, Sacroiliac region****739.8 Somatic Dysfunction, Rib cage****846 Sprains and Strains, Sacroiliac Region****847.2 Sprains and Strains, Lumbar Region**

(Note: The above list of diagnoses is representative, though not exhaustive. All diagnoses for back pain not listed above or described elsewhere in this guide shall also be considered under "Chronic Backache".)

**SERVICE MEMBER MUST HAVE COMPLETED/PROVIDE PRIOR TO INITIATING WAIVER**

- Orthopedic surgeon, sports medicine, osteopathic, chiropractic, rheumatological, and/or pain management specialist recommendation(s) for the return to flight status with no restrictions - Must be **documented** on last clinical note (electronic or paper). Further, this consult must state that the member is asymptomatic, stable, may resume full unrestricted activity, and is not anticipated to require surgical or other invasive intervention during his/her future period of military service.
- If any of the above noted specialty providers document physical limitations, a complete picture of the patient's level of physical activity and limitations must be included in the documentation.
- Any surgery/procedure note(s) (electronic or paper) utilized in the treatment of the back pain must be documented.
- Must have completed course of physical therapy/rehabilitation and provide end of care summary, including any post-care recommendations.
- Copies of prior PEB, FNAEB, or HFB if related to this diagnosis. If placed on LIMDU / PEB or if anticipate grounding for greater than 60 days, present to Flight Surgeon for Grounding Physical.
- Provide administrative information (electronic or paper) to include command UIC, command address, personal address, phone number, designator, flight hours (total and last 6 months), primary aircraft flown, and years of service.

**STANDARDS & REQUIREMENTS TO BE MET PRIOR TO SCHEDULING WAIVER EXAM WITH FLIGHT SURGEON**

- **CURRENT PHYSICAL LIMITATIONS:** Member must be able to demonstrate full active range of motion of the spine without assistance or need for pain medication.
- **TREATMENT:** Somatic dysfunction which is amenable to OMT/Manual medicine, unless persistent, is NCD. Waiver may be recommended when the pain is controlled by conservative, non-pharmacologic means, and is not associated with an organic cause.
- **MEDICATIONS:** For designated personnel with chronic backache requiring low dose NSAIDs (ibuprofen or naproxen only) or acetaminophen who can maintain close supervision by a Flight Surgeon may be considered for waiver on a case-by-case basis. Must not require controlled substances or muscle relaxants to control pain.
- **SPECIAL TEST STANDARDS/FINDINGS/LEVELS:** Documentation of the patient's ability to pass a USN PRT or Marine PFT (as applicable); including a report of the score from each section of the most recent test.

**AEROMEDICAL SUMMARY REQUIRED DOCUMENTATION BY FLIGHT SURGEON**

How Condition Was Discovered: Mechanism of injury, date of injury, and whether first time or recurrent.

Aviation History: Type of aircraft and type of egress.

Physical Exam: Document any visible asymmetry of the spine; any tenderness on palpation; ability to and degree of flex/extend, rotate L/R, and side bend L/R (include number of degrees for each); motor, sensory, and reflex findings of related extremities; muscle strength testing of related extremities; and results of straight leg test (for lumbar spine).

Studies: Results of all x-rays, CT scans, and MRI scans obtained in the evaluation of this condition.

Discussion: Brief summary of why this member is WR based on Aeromedical Waiver Guide standards.

Recommendation: NPQ but AA and any caveats for follow on care.

Procedure: Up load any operative/other procedural notes (if applicable).

Medications: Document no longer using any medication for pain. However, for designated personnel with an occasional requirement for continued use of medication for pain, the ONLY acceptable medications for PRN use are acetaminophen, ibuprofen or naproxen.

Consults: Up load final orthopedic, osteopathic, chiropractic, rheumatological, and/or pain management consult(s) report and physical therapy end of care notes (as applicable).

Other: If LIMDU/PEB has been held, results of this board must be included in waiver package.

<b>FOLLOW UP REQUIREMENTS</b>	If the service member becomes symptomatic and in accordance with applicable periodic flight physical requirements.
<b>EXAM</b>	Documentation of a serial exam of the spine as described in "Physical Exam" section (above). Note: No serial radiological studies are required unless the service member is symptomatic.

**APPENDICES:** None

**References:**

- [1] Chou, R., Qaseem, A., Snow, V., Casey, D., Cross, T., Shekelle, P., and Owens, D. (2007). Diagnosis and treatment of low back pain: A joint clinical practice guideline from the American College of Physicians and the American Pain Society. *Annals of Internal Medicine*, 147, pp. 478-491. Retrieved from: <http://www.healthquality.va.gov/guidelines/Pain/lbp>.
- [2] Hansen, O and Wagstaff, A. (2001, March). Low Back Pain in Norwegian helicopter aircrew. *Aviation, Space, and Environmental Medicine*, 72(3), pp. 161-164. Retrieved from: <http://submissions.miracd.com/SecureView/ASMArchive/brwyug215vx88ke3ye67.pdf>
- [3] Phillips, A. (2011, March). The scope of back pain in Navy helicopter pilots. Naval Post Graduate School, Monterey, CA. Retrieved from: [http://edocs.nps.edu/npspubs/scholarly/theses/2011/March/11Mar\\_Phillips.pdf](http://edocs.nps.edu/npspubs/scholarly/theses/2011/March/11Mar_Phillips.pdf).
- [4] Fitzgerald, A. and Crotty, J. (1971). Royal Air Force Institute of Aviation Medicine. Report # 505. London, England.
- [5] Griffin, C. (1975, November). *Proceedings of the Royal Society of Medicine*, 68 (11). London, England.
- [6] Under Secretary of Defense for Personnel and Readiness. (2011, September 13). Section 17 - Spine and Sacroiliac Joints, Enclosure (4), DoD Instruction 6130.03 (Change 1) - Medical Standards for Appointment, Enlistment, or Induction in the Military Services, pp. 29-30. U.S. Department of Defense. Washington, DC.
- [7] Navy Bureau of Medicine. (2012, May 2). Article 15-48 – Spine and Sacroiliac Joints, Chapter 15 – Physical Examinations and Standards, NAVMED P-117 (Change 140) - Manual of Medicine, pp. 15-36 – 15-37. U.S. Department of the Navy. Washington, DC.

## 13.4 INTERVERTEBRAL DISC DISEASE

Last Revised: (GS/FT)  
17 Apr 2014  
Last Reviewed:  
30 May 2014

	Applicant	Class 1			Class 2	Class 3
		SG 1	SG 2	SG 3		
<b>CD</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>NCD</b>	+/-	+/-	+/-	+/-	+/-	+/-
<b>WR</b>	+/-	+/-	+/-	+/-	+/-	+/-
<b>WNR</b>	+/-	+/-	+/-	+/-	+/-	+/-
<b>LBFS</b>	N/A	No	No	No	No	No
<b>EXCEPTIONS</b>	In those who have not undergone discectomy and do not have radicular symptoms, the condition is NCD. Waivers for multi-level discectomy are not likely, but may be considered on a case-by-case basis.					
<b>LIMDU/PEB</b>	If LIMDU/PEB has been held, Grounding PE and AMS should be submitted when board written. Results of this board must be included in waiver package. Member not eligible for waiver until returned to Full Duty by Board.					

Key	
+/-	Depends upon whether listed requirements met, waiver may or may not be recommended ("Case-by-Case" basis)

**AEROMEDICAL CONCERNS:** Discomfort or pain from intervertebral disc disease can make it difficult to remain seated for long periods and can hamper performance. In addition, forces of ejection, excess G forces, and catapult launches and arrested landing can exacerbate this condition.

In the United States, the most common diagnosis in patients with low back pain is disc degeneration [1]. Ninety-three percent of lumbar disc herniations occur at the L4-L5 and L5-S1 levels [2]. Cervical symptoms may arise as a result of high-G maneuvering, particularly in crew members other than the pilot in control of the aircraft. Conservative therapy with NSAIDs, PT, and OMT/manual medicine is often effective in managing symptoms. Invasive non-surgical measures, such as spinal epidural injection(s) by pain management specialists after accurate diagnosis has been made, present the next level of treatment. Surgical treatment of selected cases where root compression is symptomatic and progressive is superior to non-surgical management in treating radiculopathy [3]. Operative vs. non-operative outcomes after five years have demonstrated essentially the same outcome. Acute onset of a neurological deficit requires prompt orthopedic or neurosurgical assessment.

### DIAGNOSIS/ICD-9 Codes:

**722.0 HNP without myelopathy, Cervical**  
**722.11 HNP without myelopathy, Thoracic**  
**722.10 HNP without myelopathy, Lumbar**  
**722.71 HNP with myelopathy, Cervical**  
**722.72 HNP with myelopathy, Thoracic**  
**722.73 HNP with myelopathy, Lumbar**  
**722.4 Degenerative disc disease, Cervical**  
**722.51 Degenerative disc disease, Thoracic**  
**722.52 Degenerative disc disease, Lumbosacral**  
**P80.5 Discectomy**  
**P80.51 Discectomy by laminectomy**  
**P80.59 Intervertebral disc destruction, NEC**  
**P81.00 Spinal fusion, unspecified**  
**P81.02 Anterior cervical fusion**  
**P81.03 Posterior cervical fusion**



## **P81.06 Anterior lumbar fusion**

## **P81.08 Posterior lumbar/lumbosacral fusion**

### **WAIVERS:**

**Applicants:** A history of symptomatic herniated nucleus pulposus (HNP) with or without surgery is disqualifying. Waivers may be considered on a case-by-case basis. With few exceptions, multi-level discectomies should be considered to be permanently disqualifying. Initial applicants must meet DoD and Department of the Navy Standards as set forth in references [4] and [5] and conditions that do not meet these requirements are **Considered Disqualifying, Waiver Not Recommended (CD, WNR)**.

**Designated Personnel:** In designated personnel who are currently asymptomatic, the condition is CD but is usually considered for a waiver. Students already under instruction may also be considered for a waiver. All Dispositions and waiver requests must be based upon the following criteria, defined by region:

### **Cervical:**

1. **Without radicular symptoms:** Clinical presentation is neck pain, occasional spasms, and/or occasional crepitus. Radiographs show narrowing, osteophytes, or are normal. Treatment is symptomatic with NSAIDs, analgesics and cervical traction. OMT/Manual medicine by an experienced physician may also be helpful. Condition is typically seen in the 4th decade of life. **Aeromedical disposition is Considered Disqualifying, Waiver Recommended (CD, WNR).**
2. **With radicular symptoms:** Clinical presentation is similar to that described above, but also includes motor, sensory, and/or DTR changes consistent with radiculopathy. Levels usually are C-4/5, C-5/6 (most common) C-6/7, or C-7/T-1. Radiographs/MRI may show hard disks, foraminal narrowing, and/or disk space narrowing. Treatment is same as above. Failure to respond to conservative therapy and/or progressive symptoms may necessitate neurosurgical consultation. Surgical treatments are generally anterior cervical fusion (ACF) and/or posterior cervical laminectomy/foramenotomy. ACF may be performed with graft only, or with graft plus internal fixation.

### **Aeromedical disposition:**

1. **Symptomatic patient without surgery: Considered Disqualifying, Waiver Not Recommended (CD, WNR)**
2. **Surgically treated:**
  - a. One level corrected by ACF, 6 months post op, pain free, and with no radicular symptoms. Radiographs demonstrate healing with no instability in flexion and extension views. **CD, WR, including rotary wing and ejection seat aircraft.**
  - b. TWO levels corrected by ACF or one level total disc arthroplasty, 6 months post op, pain free, and with no radicular symptoms. Radiographs demonstrate healing with no instability in flexion and extension views. **CD, WR, excluding ejection seat aircraft (waivers considered on a case-by case basis for rotary wing aircraft).**

**Note:** With one cervical level fused mid-cervical spine, expect a 5 degree loss of rotation and a 15 degree loss with two levels fused. Flexion/extension is generally not compromised.

### **Lumbosacral:**

1. **Without radicular symptoms:** Also see section 13.3 above, titled CHRONIC BACK PAIN. Clinical presentation is low back and/or sacroiliac joint area pain with occasional spasms. Sacroiliac joint dysfunction may have subjective symptoms of radicular-like symptoms in the pelvic girdle and/or lower lumbar spine area but symptoms generally do not extend below the knee. Clinically, no neurological deficits are demonstrated. Radiographs upon initial presentation without recent trauma are rarely helpful. Radiographs may show narrowing of disk spaces and/or osteophytes or be normal. Treatment is symptomatic with NSAIDs, analgesics, and traction. OMT/Manual medicine by experienced physician may be helpful.
2. **With radicular symptoms:** Presentation is as noted above, but with the presence of radiculopathy. Neurological examination demonstrates motor, sensory, or DTR changes and/or positive straight leg raise. MRI or myelogram demonstrates HNP with nerve root impingement

consistent with the observed neurological deficit. All patients should undergo a period of symptomatic treatment.

**Aeromedical disposition:**

1. **Symptomatic patient without surgery: Considered Disqualifying, Waiver Not Recommended (CD, WNR)**
2. **Asymptomatic patient with radicular history over the previous year (treated either operatively or non-operatively): Considered Disqualifying (CD, WR), including rotary wing and ejection seat aircraft.**

**Notes:** An MRI diagnosis of herniated disc or bulging disc at any level of the spine, in the absence of clinical findings, is meaningless. Twenty to thirty percent of ASYMPTOMATIC people have herniated disks by MRI. Spinal strengthening and range of motion routines with non-impact aerobic training are to be initiated as soon as allowed by the operating surgeon. Following successful surgical or conservative treatment, waiver is possible at six weeks if the following conditions are met:

**SERVICE MEMBER MUST HAVE COMPLETED AND/OR PROVIDED PRIOR TO INITIATING WAIVER**

- Be released from care of orthopedic surgeon or neurosurgeon with recommendation(s) for the return to flight status with no restrictions - **Must be documented** on last clinical note (electronic or paper). Further, this consult must state that the member is asymptomatic, stable, and is not anticipated to require further surgical or other invasive intervention during their future period of military service.
- If any of the above noted specialty providers document physical limitations, a complete picture of the patient's level of physical activity and limitations must be included in the documentation.
- Any surgery/procedure note(s) (electronic or paper) utilized in the treatment of the back pain must be documented.
- Must have completed any course of physical therapy/rehabilitation prescribed by the above noted specialty providers and have received an end of care summary, including any post-care recommendations.
- Be able to pass the USN PRT or USMC PFT (minus sit ups for lumbar patients).
- Have copies of prior PEB, FNAEB, or HFB if related to this diagnosis. If placed on LIMDU / PEB or if anticipate grounding for greater than 60 days, present to Flight Surgeon for Grounding Physical.
- Email or provide administrative information to include command UIC, command address, personal address, phone number, designator, flight hours (total and last 6 months), primary aircraft flown, and years of service.

**STANDARDS & REQUIREMENTS TO BE MET PRIOR TO SCHEDULING WAIVER EXAM WITH FLIGHT SURGEON**

- **CURRENT PHYSICAL LIMITATIONS:**
  - Be essentially pain free with no medications other than Flight Surgeon approved NSAIDs and/or acetaminophen.
  - Have good flexibility and range of motion.
- **TREATMENT:** If surgically fused, post-operative flexion and extension x-rays must also be submitted as evidence of stability.
- **MEDICATIONS:** For designated personnel with intervertebral disc disease requiring low dose NSAIDs (ibuprofen or naproxen only) or acetaminophen who can maintain close supervision by a Flight Surgeon may be considered for waiver on a case-by-case basis. Must not require controlled substances or muscle relaxants to control pain.
- **SPECIAL TEST STANDARDS/FINDINGS/LEVELS:** Documentation of the patient's ability to pass a USN PRT or Marine PFT (as applicable); including a report of the score from each section of the most recent test.

**AEROMEDICAL SUMMARY REQUIRED DOCUMENTATION BY FLIGHT SURGEON**

How Condition Was Discovered: Mechanism of injury, date of injury, and whether first time or recurrent.

Aviation History: Type of aircraft and type of egress.

Physical Exam: Document any visible asymmetry of the spine; any tenderness on palpation; ability to flex/extend (include number of degrees for each), rotate L/R, and side bend L/R; motor, sensory, and

reflex findings of related extremities; muscle strength testing of related extremities; results of straight leg test (for lumbar spine).

Studies: Results of all x-rays, CT scans, and MRI scans obtained in the evaluation of this condition.

Discussion: Brief summary of why this member is WR based on ARWG standards

Recommendation: NPQ but AA and any caveats for follow on care

Procedure: Up load any operative notes (if applicable).

Medications: Document no longer using any medication for pain. However, for designated personnel with an occasional requirement for continued use of medication for pain, the ONLY acceptable medications for PRN use are acetaminophen, ibuprofen or naproxen.

Consults: Up load final orthopedic or neurosurgical consult reports and physical therapy end of care notes (as applicable).

Other: If LIMDU/PEB has been held, results of this board must be included in waiver package.

<b>FOLLOW UP REQUIREMENTS</b>	If the service member becomes symptomatic and in accordance with applicable periodic flight physical requirements.
<b>EXAM</b>	Documentation of a serial exam of the spine as described in "Physical Exam" section (above). Note: No serial radiological studies are required unless the service member is symptomatic.

**APPENDICES:** None

#### References.

- [1] United States Bone and Joint Initiative. (2011). *The burden of musculoskeletal disease in the United States*, p. 24. The Burden of Musculoskeletal Diseases in the United States Organization. Rosemont, IL. Retrieved from:  
[http://www.boneandjointburden.org/pdfs/BMUS\\_chpt2\\_spine.pdf](http://www.boneandjointburden.org/pdfs/BMUS_chpt2_spine.pdf)
- [2] Weinstein, J., Lurie, J., Tosteson, T., Tosteson, A., Blood, E., Abdu, W., Herkowitz, H., Hilibrand, A., Albert, T., and Fischgrund, J. (2008, December 1). *Spine*, 33 (25), pp. 2789-2800. Philadelphia, PA.
- [3] Barth, M., Weiss, C., and Thome, C. (2008). Two-year outcome after lumbar microdiscectomy versus microscopic sequestrectomy: Part 1: Evaluation of clinical outcome. *Spine*, 33 (3), pp. 265-272. Philadelphia, PA.
- [4] Under Secretary of Defense for Personnel and Readiness. (2011, September 13). Section 17 - Spine and Sacroiliac Joints, Enclosure (4), DoD Instruction 6130.03 (Change 1) - *Medical Standards for Appointment, Enlistment, or Induction in the Military Services*, pp. 29-30. U.S. Department of Defense. Washington, DC.
- [5] Navy Bureau of Medicine. (2012, May 2). Article 15-48 – Spine and Sacroiliac Joints, Chapter 15 – Physical Examinations and Standards, NAVMED P-117 (Change 140) - *Manual of Medicine*, pp. 15-36 – 15-37. U.S. Department of the Navy. Washington, DC.

## 13.5 KNEES – LIGAMENT/MENISCAL TEARS

**AEROMEDICAL CONCERNS:** An unstable knee is a safety factor during rudder/ brake pedal operations, emergency egress, or water and land survival (both training and real life scenarios).

**WAIVER: Meniscal injuries that are surgically repaired do not require a waiver (NCD).** Anterior cruciate ligament injuries in designated personnel that are treated surgically OR conservatively require a one-time waiver with follow-up exams (CD/WR). Applicant personnel who have had ACL repair are eligible for a one-time waiver with follow-up exams (CD/WR). Conservatively treated ACL tears are CD but may be considered for waiver in **designated personnel only** after completion of rehabilitation if patient is symptom free and functionally stable as defined above.

### INFORMATION REQUIRED:

1. A complete picture of the patient's level of physical activity, limitations, and "normal" documentation.
2. Orthopedic consult must state that the knee is asymptomatic, stable, and if surgery was performed, the successful outcome of the surgery.
3. The patient must not require medication to control pain.
4. Documentation of the patient's ability to pass a USN PRT (swim or run).
5. Normal physical exam of the knee, which must document anterior drawer test, McMurray's test, medial and lateral stability, absence of swelling or effusion, absence of tenderness, and full range of motion.

**TREATMENT:** Surgically repaired ACL's are CD but will be considered for a waiver when asymptomatic and functionally stable. **Conservatively treated ACL injuries (no surgery) may be recommended for a waiver in designated personnel.** Particularly with non-surgical treatment, a careful determination of stability, level of function, and symptoms are crucial for waiver determination.

**DISCUSSION:** Anterior cruciate ligament tears are usually accompanied by associated damage to medial and often the lateral complexes as well. These result from forced flexion or hyperextension injuries in combination with a valgus or varus stress. A positive "anterior drawer sign" is evident on physical exam, usually with findings of medial ligamentous instability as well. Avulsion fracture of the anterior tibial spine may be found on x-ray. Following surgical repair, intensive quadriceps building is required to prevent recurrent injury.

### ICD-9 CODES:

**717.3 Medial Meniscal derangement**

**717.40 Lateral Meniscal derangement**

**717.7 Chondromalacia of the patella (patello-femoral pain syndrome)**

**717.83 Knees - Ligament/Meniscal Tears**

**717.83 Anterior Cruciate Ligament disruption, old**

**717.84 Posterior Cruciate Ligament disruption, old**

**P80.26 Knee Arthroscopy**

## 13.6 ORTHOPEDIC HARDWARE, RETAINED

**AEROMEDICAL CONCERNS:** Discomfort due to retained hardware and risk of refracture are safety of flight and mission completion concerns.

**WAIVER:** Retained hardware in the upper and lower extremities is NCD provided there has been resolution of the underlying orthopedic problem, that the hardware is not subject to trauma, is intact and in the intended location, and does not weaken the bony structure. Retained hardware in the spine is CD in applicants, no waiver. Designated personnel may be considered strictly on a case-by-case basis. See Section 13.4 for guidance related to hardware in the cervical spine related to fusion or disk replacement.

### INFORMATION REQUIRED:

1. Orthopedic consultation
2. X-rays (actual films are required, not just reports)

**TREATMENT:** Removal may be a consideration when the retained hardware is associated with the problems noted above.

**DISCUSSION:** Often the underlying orthopedic condition is disqualifying and of greater concern. Retained bioelectric devices (implanted bone stimulators) imply the persistence of a disqualifying condition and are CD, no waiver. If the device has been "curative" then it is no longer required and should be removed. Hardware implanted as a component of a prosthetic joint (arthroplasty) is CD, but may be waived in designated personnel (not applicants). Most implanted hardware (screws, plates, staples, wires) are used as part of an open reduction and internal fixation of a fracture. After the fracture has healed, the hardware has done its job, and should be removed if it causes discomfort, is easily accessible, and there is minimal morbidity associated with the removal. Some types of hardware are used to affix soft tissue to bone (i.e. knee ligament and rotator cuff repair, shoulder capsulorrhaphy). Removal of these is generally not indicated. Pedicle screws, rods, circlage wires, and fixation plates too frequently become broken as a result of metal fatigue over time and may require observation.

### ICD-9 CODE:

**V54.90 Orthopedic Hardware, Retained**

## 13.7 SHOULDER DISLOCATION

**AEROMEDICAL CONCERNS:** Dislocation of the shoulder in flight is a safety of flight issue and may adversely affect rapid egress and survival, particularly in the event of a water landing.

**WAIVER:** More than one episode of dislocation is CD for both applicants and designated personnel. Recurrent instability, if surgically corrected, is CD regardless of interval since repair, but may be considered for a waiver. If corrected surgically and heals without complications and full range of motion, the aviator may request a waiver.

**INFORMATION REQUIRED:**

1. Orthopedic consult
2. Physical therapy consult documenting full range of motion

**TREATMENT:** Surgical correction and rehabilitation. Member should also be taught a method for self-reduction.

**DISCUSSION:** The aeromedical concerns are obvious. Initially, annual submission will be required to document the absence of symptoms and recurrence. If the shoulder remains stable for more than one year post-op, less frequent submission may be requested.

**ICD-9 CODES:**

**718.31 Recurrent Shoulder Dislocation**

**P81.82 Repair of Recurrent Shoulder Dislocation**

## 13.8 SPINAL FRACTURES

**AEROMEDICAL CONCERNS:** An unstable spine can result in sudden spinal cord injury. Spinal fractures may be associated with spinal cord, nerve root, or plexus injuries. There are significant clinical implications related to whether the fractures occur in the cervical, thoracic, or lumbar spine. Statistically, compression fractures cluster at the thoraco-lumbar junction with T12 being the most common vertebral body involved, followed by L1 and T11.

### WAIVER:

**Cervical:** Cervical fractures are CD and require waiver, regardless of extent. **Spinous process fractures not involving the lamina, pedicle, or vertebral body are NCD.** A 6 month period of grounding is required for patients with small anterior chip fracture or compression fractures of less than 25%. At 6 months, if the patient is pain-free, has full ROM, no instability on lateral views, and has no radicular symptoms, he will be considered for a waiver for non-ejection-seat aircraft only. At 12 months, if all the above criteria are still met, waiver will be considered for ejection-seat aircraft. Cervical spine fractures with more than 25% compression, with evidence of instability on lateral views, or with radicular symptoms will only be considered on a case by case basis.

**Thoracic:** A three month period of grounding for a single compression fracture with less than 50% compression or a single wedge fracture with no scoliosis on AP views. At 3 months, if the patient is pain free and with no instability, a waiver will be considered for non-ejection seat aircraft only. At 12 months, waiver will be considered for ejection-seat aircraft if all of the above criteria are still met. Thoracic spine fractures with more than 50% compression, with evidence of scoliosis, or more than one compression fracture are NPQ with a waiver considered on a case by case basis.

**Lumbar:** A three month period of grounding is required for a single compression fracture of less than 50% or a single wedge fracture with no scoliosis on an AP view. After a 3 month period of grounding, a waiver will be considered for non-ejection seat aircraft only providing the patient is pain free, no instability, no spondylolysis or spondylolisthesis, and no radicular pain. At 12 months, waiver will be considered for ejection-seat aircraft providing all of the above criteria are still met. If more than 50% compression, instability present on x-ray, radicular symptoms are present, or there is an associated HNP, then the patient is NPQ with waiver possible only on case by case basis.

### INFORMATION REQUIRED:

1. Orthopedic or neurosurgical consultation
2. All X-rays
3. MRI scan of regional neuroanatomical structures may also be required.

**TREATMENT:** Stable fractures without neurological injury respond well to conservative management. Those injuries requiring surgical decompression and/or stabilization usually leave the member with permanent disabilities incompatible with return to DIFOPS.

**DISCUSSION:** In C-spine injuries, the key element in determining aeromedical disposition is stability of the spine. Often times, the bony injuries heal with no residual instability. Ligamentous injuries, in contrast, may heal with various degrees of instability. Early on, instability is detectable by obtaining lateral views in flexion and extension of the C-spine. Chronic instability results in degenerative changes such as disc space narrowing and asymmetry. Also, osteophytic changes and foraminal narrowing are seen in the oblique views. The common wedge or chip fracture, often seen at the C4-6 level with no instability noted, has an excellent prognosis. Lumbar compression/wedge fractures generally heal with no instability. Purely ligamentous injuries of the L-spine are uncommon, however, there is potential for degenerative disc disease which could lead to herniation. Spinal compression fractures are a common ejection injury (20 - 30% of ejections), with most fractures occurring between T9 and L1. For this reason, all survivors of ejections should undergo complete spine x-rays. Finding a compression fracture on x-ray

often raises the question of the age of the fracture. Widening of the paraspinous line on x-ray and symptoms appropriate to the location of the identified fracture are indicative of an acute injury. A radioisotope bone scan may remain "hot" for up to two years post compression fracture. Once healed, the damaged area does not appear to be unduly susceptible to repeat fracture. The USAF has records of six pilots with compression fractures who ejected a second time without suffering injury. One aviator ejected four times without subsequent injury. Patients with persistent pain after fracture healing and no other radiological evidence of disease or trauma may benefit from OMT/Manual medicine consultation. C-spine treatment and evaluation should only be undertaken by the most experienced physicians. Somatic Dysfunction with traumatic fractures occurs frequently. C-spine treatment and evaluation should only be undertaken by the most experienced physicians.

**ICD-9 CODES:**

**805 Spinal Fractures**

**805.0 Fracture of Cervical spine, closed, without spinal injury**

**805.2 Fracture of Thoracic spine, closed**

**805.4 Fracture of Lumbar spine, closed**



## 13.9 SPONDYLOLYSIS

**AEROMEDICAL CONCERNS:** This condition can be a cause of low back pain, but may also cause instability leading to spondylolisthesis. Often patients are asymptomatic and the condition is noted as an incidental finding. Distracting axial or radicular pain is incompatible with safe flight operations.

**WAIVER:** CD with no waiver for non-designated personnel. For designated personnel, a waiver may be considered on an individual basis.

### **INFORMATION REQUIRED:**

1. Orthopedic, neurological or neurosurgical consultation.
2. X-rays.
3. CT and MRI scans may also be required in patients with radicular symptoms.

**TREATMENT:** Conservative treatment may achieve temporary relief of symptoms, however upon resumption of vigorous physical activities symptoms usually return.

**DISCUSSION:** The defect in the pars interarticularis (neck of the "Scotty dog") may be acquired from acute trauma, or more commonly, may result from chronic stress (stress fracture). Rarely is it of congenital origin. These occur primarily at L5-S1 and somewhat less at L4-L5. There is an inherited proclivity for the condition (dominant transmission) with an incidence that increases with age up to the end of the fourth decade. It exists in about 5% of the general population, but is much higher in certain races (Japanese, Eskimo) where it may be as high as 45%. Instability of the posterior spinal elements is associated with the development of spondylolisthesis, which is frequently progressive. This condition is likely to be accelerated by the physiological stressors of military flight activities.

### **ICD-9 CODE:**

**721.9 Spondylolysis**

## 13.10 SPONDYLOLISTHESIS

**AEROMEDICAL CONCERNS:** Spondylolisthesis is unlikely to cause incapacitation in flight but, if symptomatic, will cause considerable distraction. Theoretically, spondylolisthesis could cause severe problems on ejection.

**WAIVER:** CD with no waiver for non-designated personnel. For designated personnel, asymptomatic grade I spondylolisthesis is CD but may be considered for a waiver. Higher grades of spondylolisthesis or symptomatic grade I spondylolisthesis are also CD, but waivers may be considered on an individual basis. Patients who have had successful surgery and are currently asymptomatic may also be considered for waiver on a case by case basis.

### **INFORMATION REQUIRED:**

1. Orthopedic consult
2. Neurology consult
3. Rheumatology consult
4. OMT/Manual medicine consult (if available)

**TREATMENT:** Treatment includes education in proper body mechanics and use of the back, along with a program of daily back exercises.

**DISCUSSION:** Aircrew who has frequent symptoms should not continue to fly. Further slipping of the vertebra (usually L5) can occur with exposure to excessive gravitational forces, ejection, or even during normal activities on the ground. Aviators with infrequent symptoms who do not require surgery may still be restricted from ejection seat aircraft or carrier catapult launches and traps.

### **ICD-9 CODES:**

**738.4 Acquired spondylolisthesis**

**756.12 Congenital spondylolisthesis**

**756.18 Traumatic spondylolisthesis**